

Communicating the Effects of Ambient PM in New York City after September 11

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National Air Quality Conference
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Lower Manhattan



Background

At the time of the disaster we were....

- Considering how to incorporate real-time PM data on AIRNOW
- Planning development of PM documents
- Conducting review of PM standards
 - In scientific review phase
 - Incorporating emerging information

PM Communication Important



- Effects Reported in Press
 - Irritation of eyes and airways
 - Cough
 - Exacerbation of asthma
 - Increased airway reactivity in non-asthmatics
 - Possible permanent lung damage

Selecting a “Level of Concern”

- National ambient air quality standard (NAAQS)
 - 24-hour -150 $\mu\text{g}/\text{m}^3$ PM_{10} , 65 $\mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$
 - Annual - 50 $\mu\text{g}/\text{m}^3$ PM_{10} , 15 $\mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$
- Air Quality Index (AQI) value of 100
 - 24-hour -150 $\mu\text{g}/\text{m}^3$ PM_{10} , 40 $\mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$
 - $\text{PM}_{2.5}$ reflects protection of annual standard
- OSHA Personal Exposure Limit (PEL)
 - 5,000 $\mu\text{g}/\text{m}^3$ Respirable Particulates

Selecting a “Level of Concern”

- NAAQS

- Protect public health
- Long-term (3 years)
- Stable implementation target

- AQI

- Advise individuals
- Short-term (daily)
- Convey health information

- PEL

- Protect healthy workers
- 8-hour time-weighted average

Selecting a “Level of Concern”

- Decision - use the AQI value of 100
- Message:
 - EPA sets the level of concern to caution sensitive groups
 - For fine particles that level is $40 \mu\text{g}/\text{m}^3$, 24-hour average
 - This level is based on the AQI
 - Above this level sensitive groups should reduce exposure

Incorporating New Information

- Perhaps larger particles ($> \text{PM}_{10}$) are associated with reported irritation effects
- Coarse particles potentially associated with serious effects
- Studies suggest short-term (1-hour) peaks of fine particles could be linked with serious effects



Message - Size of Particles

- PM_{10}
 - Includes both fine (smoke) and coarse (dust) particles
 - Greatest health concern – can get into lungs
- Total Suspended Particulates (TSP)
 - Includes particles larger than PM_{10}
 - Irritation - eyes, nose and throat
 - Not likely to cause serious problems – does not get into lungs

Health Effects Message

- Particles can cause
 - Reduction in lung function
 - Exacerbation of heart and lung diseases
 - Mortality from cardiovascular and respiratory causes
 - Increased susceptibility to respiratory infections

Health Effects Message

- Fine particles (new studies)
 - Have been associated with heartbeat irregularities and heart attacks
 - Short-term peaks are also of potential concern for sensitive groups
- Groups sensitive to particles
 - People with heart or lung disease
 - Elderly people
 - Children

Health Effects Message

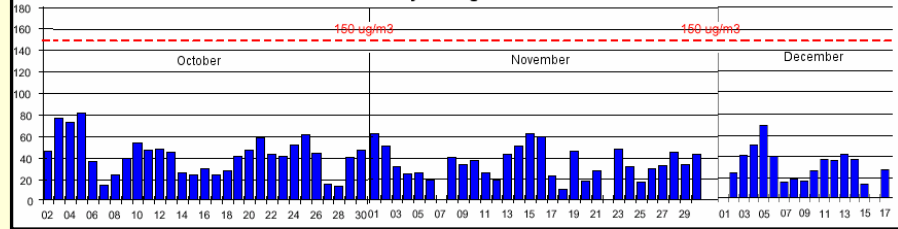
- If you have heart or lung disease
 - Have adequate medication on hand
 - Follow asthma management plan if you have asthma
- If you develop symptoms of heart or lung disease contact healthcare provider
- Reduce exposure to particles indoors
 - Prevent particles from penetrating indoors
 - Reduce indoor sources of particles
 - Reduce particle levels indoors

Cautionary Statements for PM

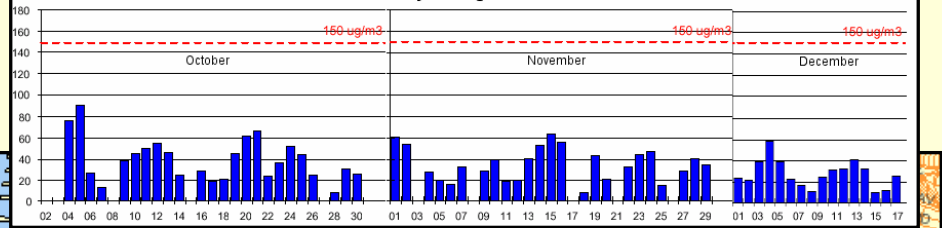
Good	None
Moderate	None
Unhealthy for Sensitive Groups	People with heart or lung disease, the elderly and children should limit prolonged or heavy exertion
Unhealthy	People with heart or lung disease, the elderly and children should avoid prolonged or heavy exertion; everyone else should limit prolonged or heavy exertion
Very Unhealthy	People with heart or lung disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged or heavy exertion

PM₁₀ Daily Values

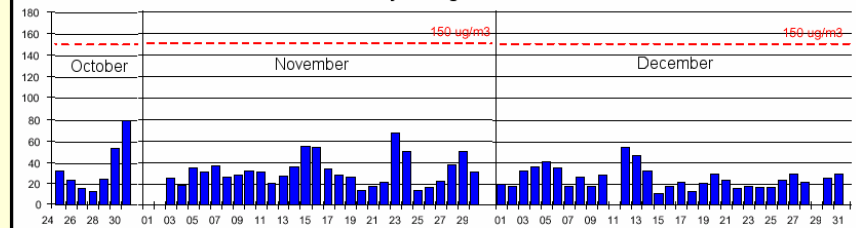
Manhattan Borough Community College
PM10 Daily Average Post Attack



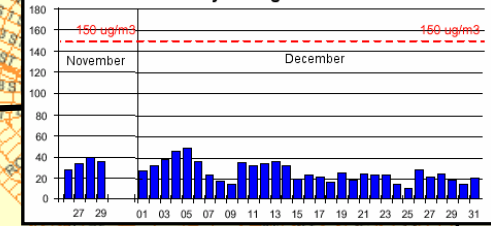
Canal Street Post Office
PM10 Daily Average Post Attack



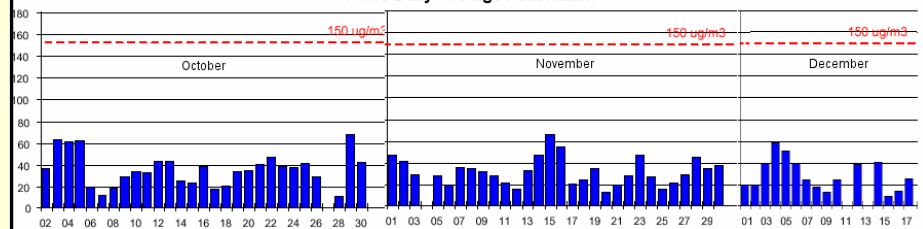
Albany Street
PM10 Daily Average Post Attack



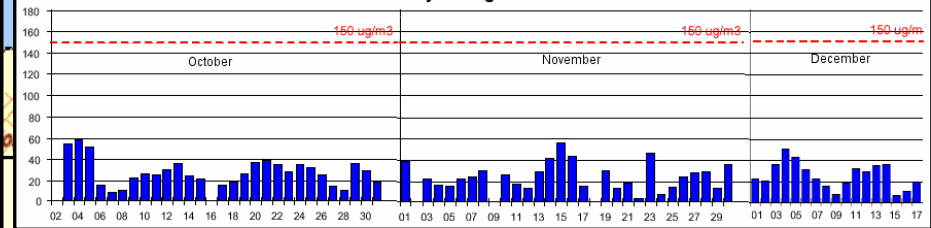
Wall Street
PM10 Daily Average Post Attack



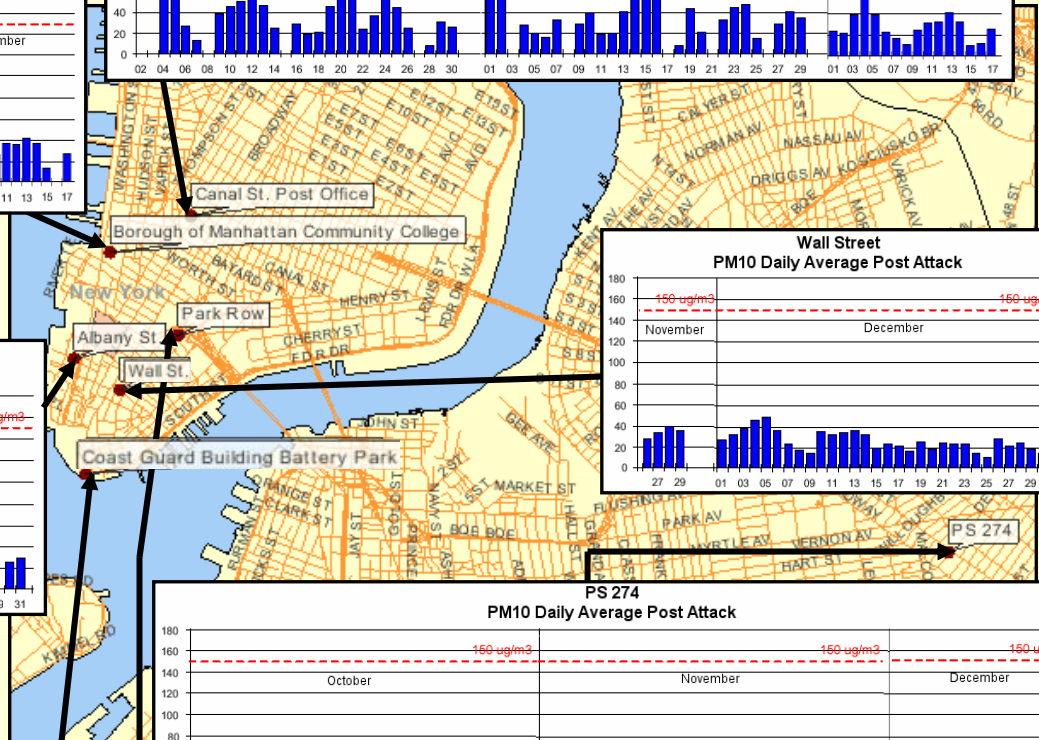
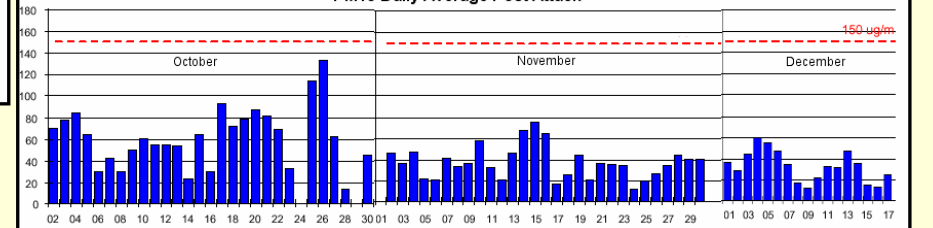
Coast Guard Building Battery Park
PM10 Daily Average Post Attack

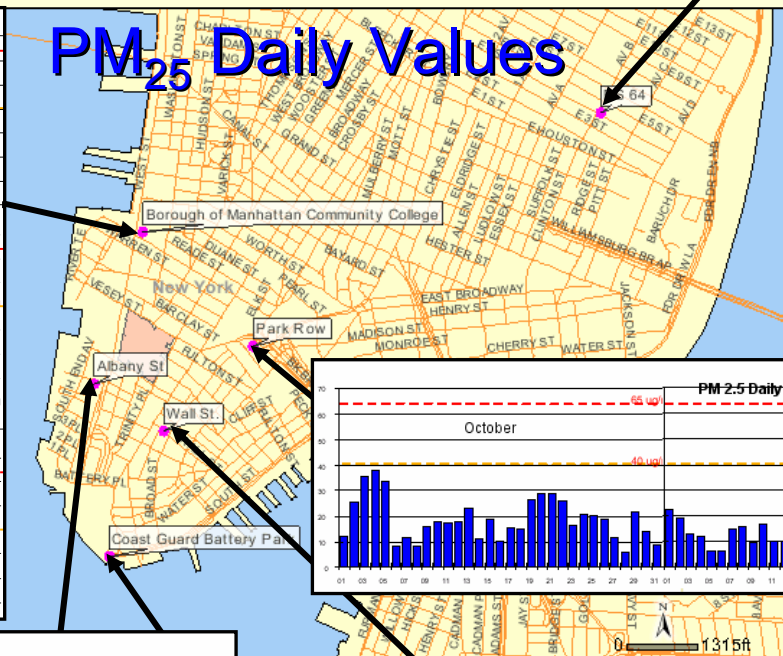
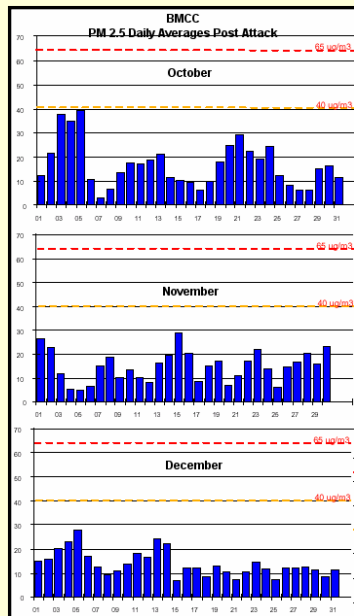
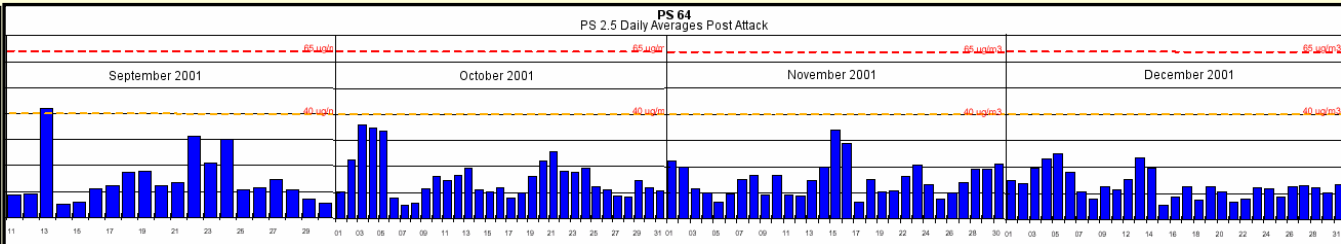
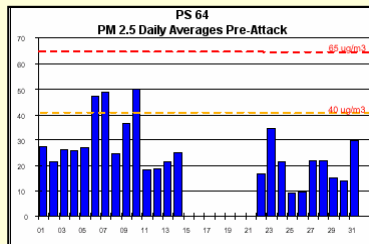


PS 274
PM10 Daily Average Post Attack

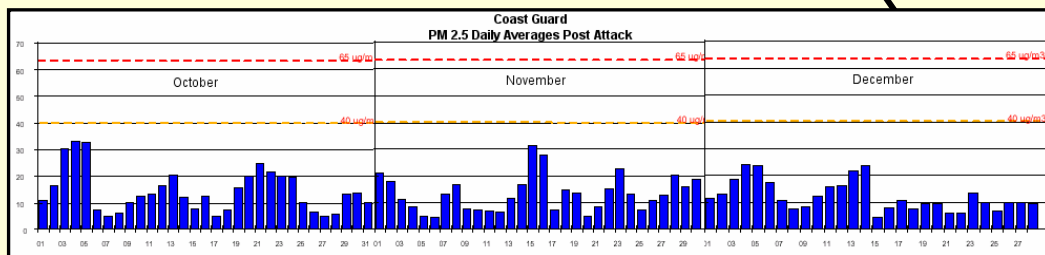
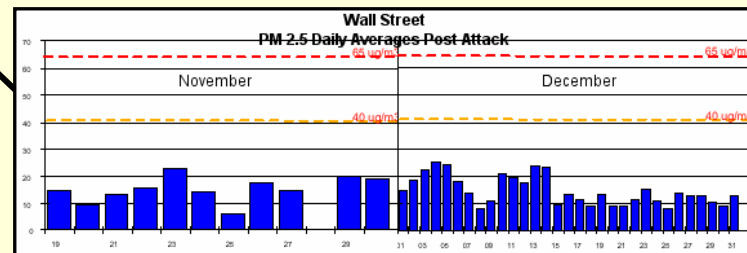
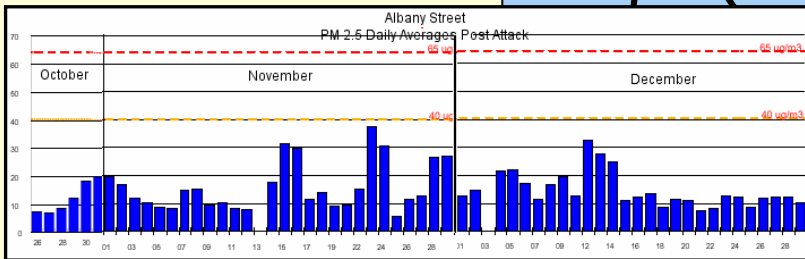
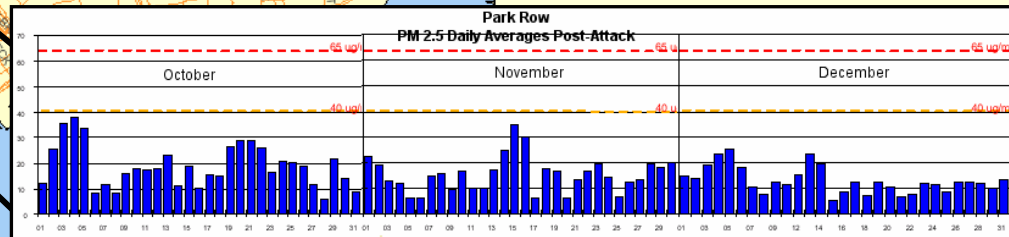


Park Row
PM10 Daily Average Post Attack

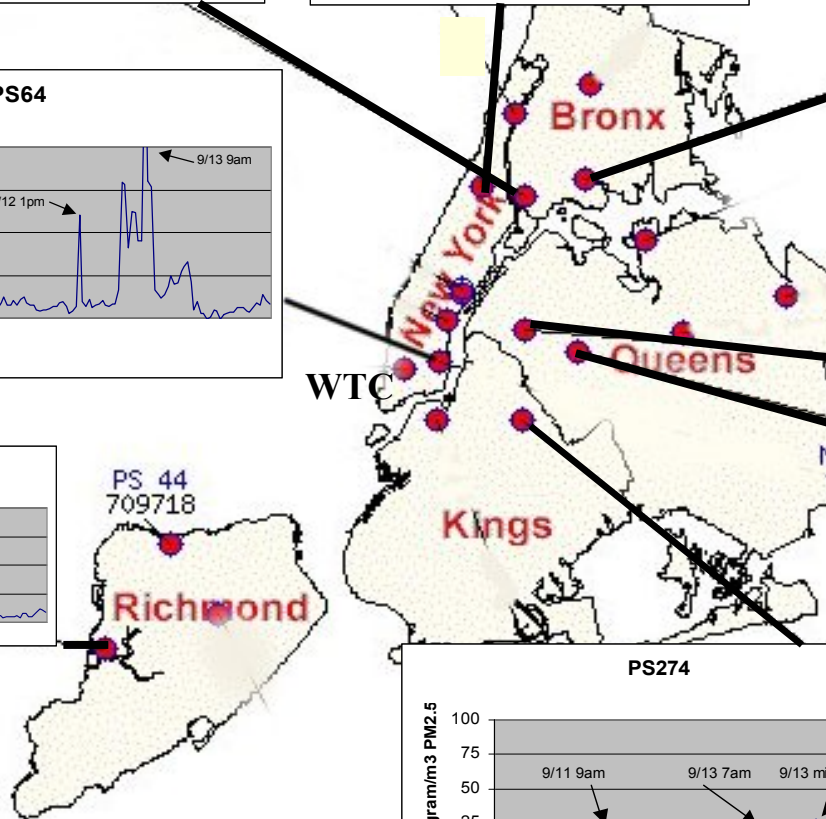
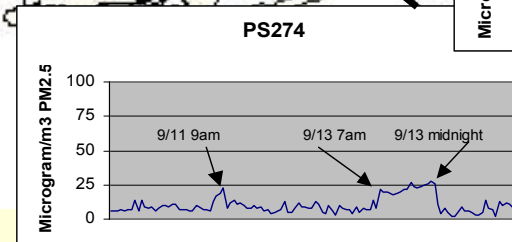
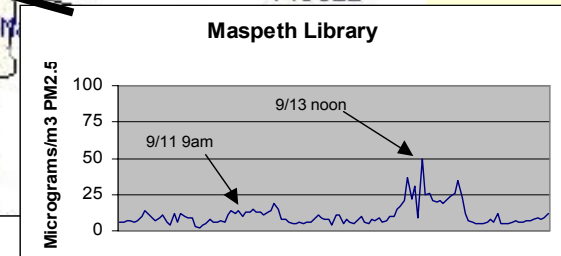
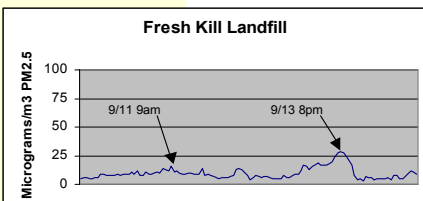
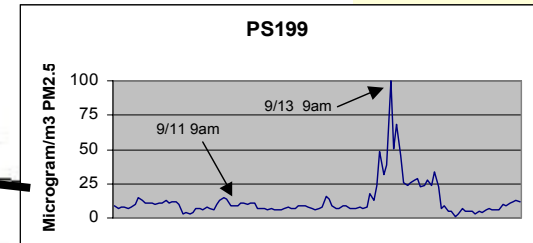
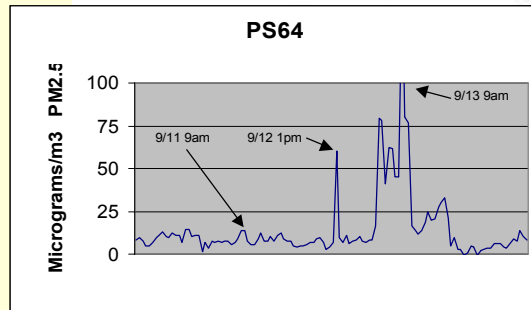
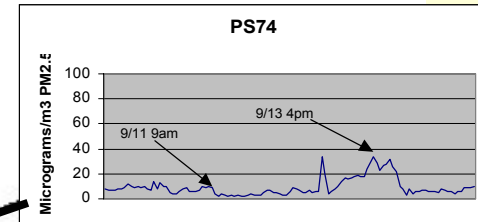
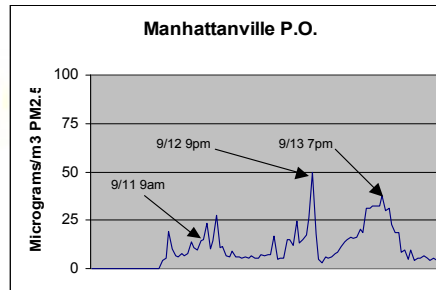
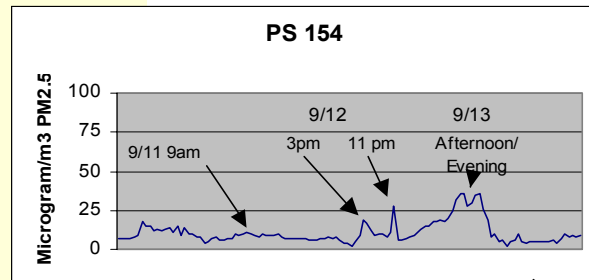




Annual Avg(Since 9/11):15.23
 Annual Avg (Since 10/01):15.33
 Annual Avg(Jan-Sept30): 16.93
 Annual Avg 2000: 15.58
 3rd QTR 2001 Avg: 18.31
 3rd QTR 2000 Avg: 16.51

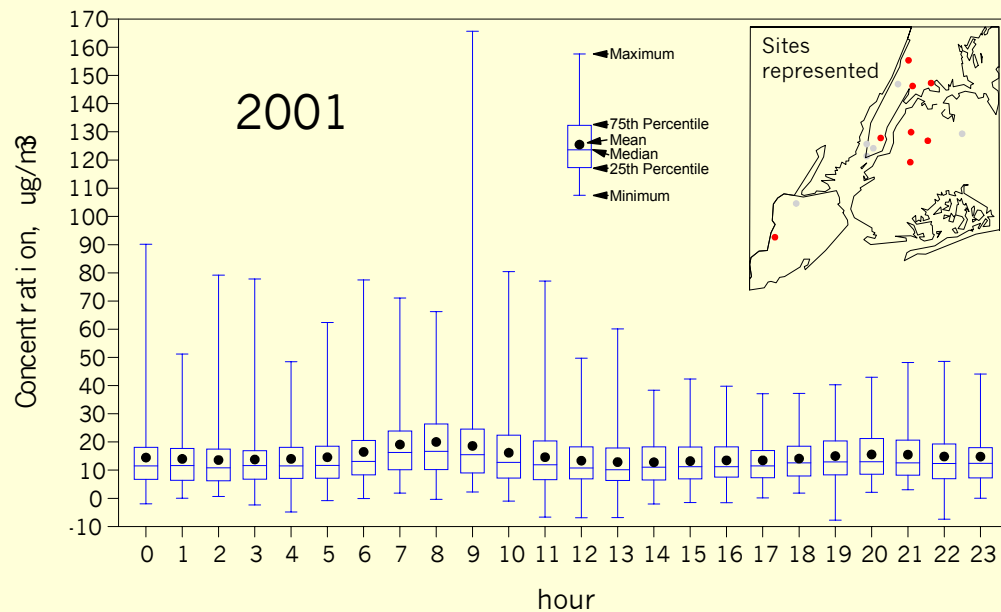


Hourly PM_{2.5} Measurements in NYC Show Elevated Levels During Week of Sept 10, 2001

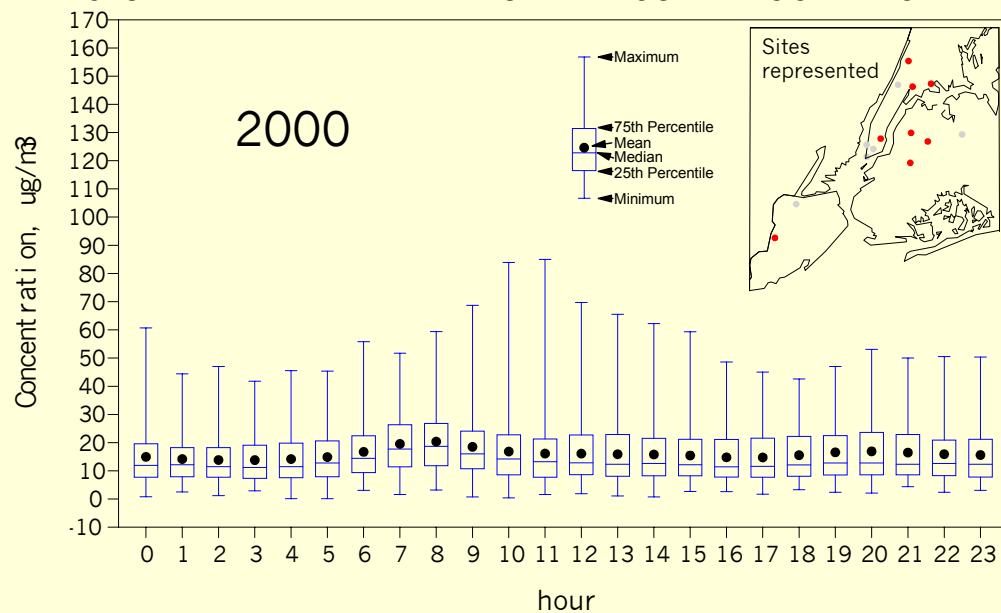


EIGHT SITES WITH DATA IN 2000 and 2001

PM2.5 Concentrations in NYC from 09/11/01 to 10/27/01



PM2.5 Concentrations in NYC from 09/11/00 to 10/27/00



Key Observations - Data

- PM_{10} and $PM_{2.5}$, outside restricted zone, generally below “levels of concern”
- $PM_{2.5}$ - some high hourly values
 - Mean values comparable to previous year
 - More variability
- Composition of $PM_{2.5}$ unusual
 - Crustal
 - More alkaline

Communicate Effectively

- Understand baseline PM air quality
 - Geographic and temporal variability
 - Continuous monitoring is critical
 - Composition of PM
- Understand PM health effects
 - Effects and sensitive groups
 - Emerging information
 - Effects of other pollutants in mix

Resources

- Web

- AIRNow <http://www.epa.gov/airnow>
 - Smoke/Fire – under development
- NYC <http://www.epa.gov/epahome/wtc>

- Documents

- Air Quality Guide for PM
- PM brochure – Summer 2002
- Air pollution health effects poster for use by health care providers – Summer 2002

- Non-EPA

- Wildfire Smoke - Guide for PH Officials